

Silicon ladders

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Introduction

We now have models in G4 of the MAPS and INTT ladders.

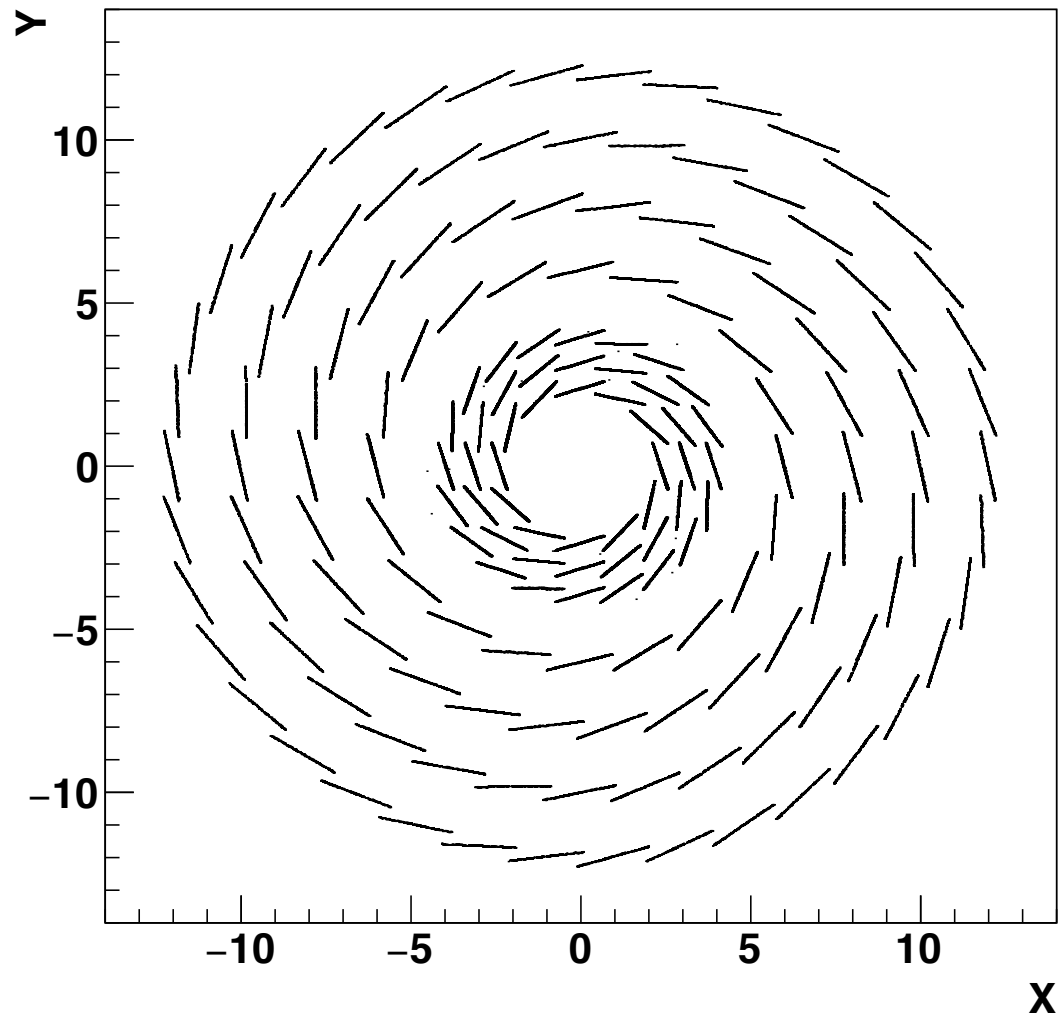
The MAPS ladders are copied from ALICE.

The INTT ladder model was coded by Gaku.

Here is a first look at results, using single Upsilon events.

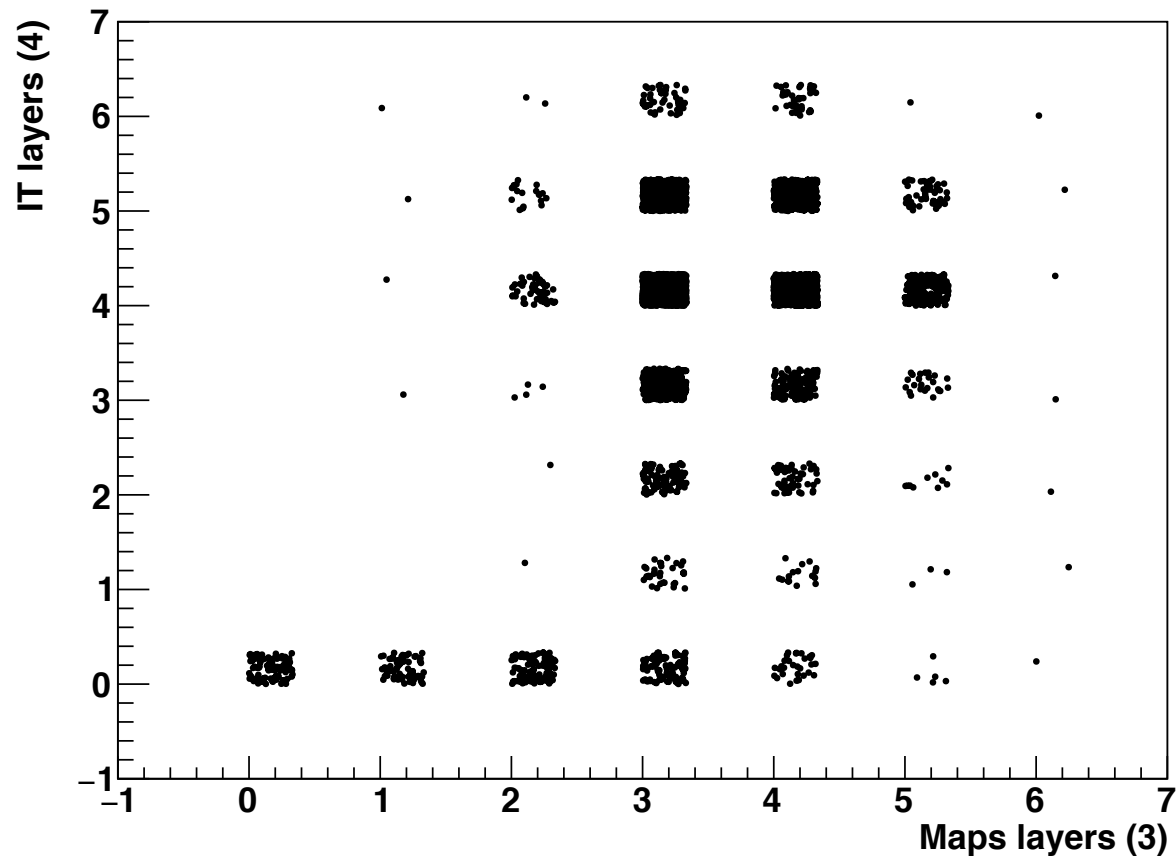
Cluster distributions

MAPS+INTT clusters



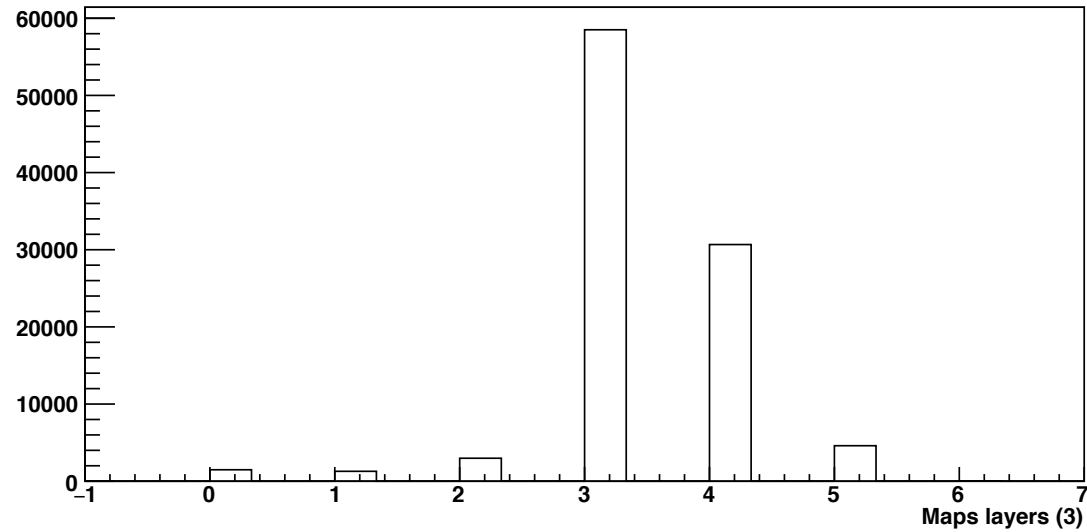
MAPS vs INTT hits per track

Layer hits per track INTT vs. MAPS

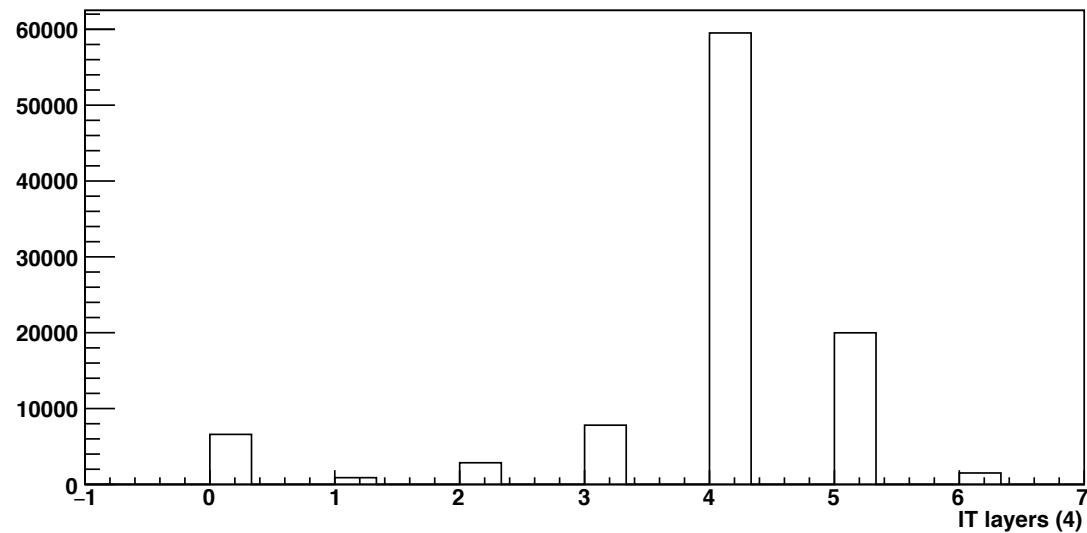


Layers hit per track

MAPS layers hit per track



INTT layers hit per track



Interpretation of # of hit layers per track

MAPS:

3 layer hits per track: 58,000

4 layer hits per track: 30,000

- 34% of tracks hit more than one sensor in a ladder

INTT:

4 layer hits per track: 60,000

5 layer hits per track: 20,000

- 25% of tracks hit more than one sensor in a ladder

Naively, suggests MAPS is roughly 34% thicker and INTT is roughly 25% thicker due to azimuthal overlaps

Tracking performance - mass resolution ⁷

Default tracking - no track refitting yet.

| Configuration | INTT thickness (% rad length) | Y(1S) ΔM (MeV) |
|---|----------------------------------|---------------------------|
| ----- | ----- | ----- |
| maps ladders+TPC | 0 | 81.1 +/- 1.0 |
| maps ladders+INTT ladders (1 layer)+TPC | 1.01 | 84.8 +/- 1.2 |
| maps ladders+INTT ladders (2 layer)+TPC | 2.02 | 90.7 +/- 1.7 |
| maps ladders+INTT ladders (3 layer)+TPC | 3.03 | 100.0 +/- 1.8 |
| maps ladders+INTT ladders (4 layer)+TPC | 4.04 | 105.7 +/- 2.4 |

Summary/Conclusions

Ladder models of MAPS and INTT are working

- Default tracking only, so far
- Still need to try track refitting (Haiwang)
- Still have to look at pattern recognition in Hijing events

Thickness is a problem:

- The ladder model is thicker than the cylinder model because of azimuthal overlaps of the staves
- With default tracking the $Y(1S)$ mass resolution is definitely too large for 4 INTT layers, and probably too large for 3 INTT layers
- We have to see if track refitting improves this